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ABSTRACT

An evaluation of the reproductive health programs of six diverse school-based clinics measured the impact of the clinics on sexual behavior and contraceptive use. All six clinics served low-income populations; at five of them, the great majority of the students were black. An analysis of student visits by type of care given found that these clinics were not primarily family planning facilities; rather, they provided reproductive health care as one component of a comprehensive health program. Student survey data was collected in four schools with clinics and four nearby comparison schools with similar social and demographic characteristics but without clinics. Because the other two schools included in the evaluation had not yet opened their clinics, preclinic baseline data and 2-year postclinic data were collected for them. Findings indicated that the clinics neither hastened the onset of sexual activity nor increased its frequency. The clinics had varying effects on contraceptive use. Providing contraceptives on site was not enough to significantly increase their use; in only one of the three sites that did so were students in the clinic school significantly more likely than students in the comparison school to have used birth control during last intercourse. Although the data suggest that the clinics probably prevented small numbers of pregnancies at some schools, none of the clinics had a statistically significant effect on school-wide pregnancy rates. (ABL)

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Six School-Based Clinics: Their Reproductive Health Services and Impact on Sexual Behavior

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By Douglas Kirby, Cynthia Waszak and Julie Ziegler

Summary

An evaluation of the reproductive health programs of six diverse school-based clinics measured the impact of the clinics on sexual behavior and contraceptive use. All six clinics served low-income populations; at five of them, the great majority of the students served were black. An analysis of student visits by type of care given found that these clinics were not primarily family planning facilities; rather, they provided reproductive health care as one component of a comprehensive health program.

Student survey data collected in the clinic schools and nearby comparison schools (four sites) or collected both before the clinic opened and two years later (two sites) indicated that the clinics neither hastened the onset of sexual activity nor increased its frequency. The clinics had varying effects on contraceptive use. Providing contraceptives on site was not enough to significantly increase their use; in only one of the three sites that did so were students in the clinic school significantly more likely than students in the comparison school to have used birth control during last intercourse. However, condom use rose sharply at one clinic school that had a strong AIDS education program and was located in a community where AIDS was a salient issue. At another clinic school, where pregnancy prevention was a high priority and staff issued vouchers for contraceptives, the use of condoms and pills was significantly higher than in the comparison school. A third clinic school—which focused on high-risk youth, emphasized pregnancy prevention and dispensed birth control pills—recorded a significantly higher use of pills than its comparison school. Although the data suggest that the clinics probably prevented small numbers of pregnancies at some schools, none of the clinics had a statistically significant effect on school-wide pregnancy rates.

"In each school, a large majority of students were sexually experienced, and many had engaged in sex before entering high school. Therefore, programs to delay or reduce sexual activity should begin in elementary or junior high school."

Introduction

Since the first school-based health clinic opened in a Dallas high school in 1970, such clinics have been seen not only as a means of providing basic health care to medically underserved teenagers, but as a promising way of addressing some of the intractable and complex health and social problems, particularly unintended pregnancy, that face young people.

Currently, there are more than 178 school-based clinics operating in middle schools and junior and senior high schools in 32 states; they may be found in most major cities and many rural areas.[1] Many of the clients served by these clinics are low-income minority youth with limited access to other sources of health care. School-based clinics provide them with a wide range of medical and counseling services, including primary health care, physical examinations, laboratory tests, diagnosis and treatment of illness and minor injuries, immunizations, gynecological examinations, birth control information and referral, pregnancy testing and counseling, referral for prenatal care, nutrition education, weight reduction programs and counseling for substance abuse. A few dispense contraceptives, offer on-site prenatal care or provide day care for children of students.

School-based clinics are well used by students in the schools served. On the average, about half the students attending each school enroll for clinic services; that is, they complete a registration form and obtain parental permission to use the clinic. About eight in 10 of those enrolled actually use the clinics' services, and for almost half of those enrolled, school-based clinics are their sole or primary source of health care.[2]

There has been relatively little research on the clinics' impact on student sexual behavior, partly because most of the increase in school-based clinics has occurred in the last few years. However, a few studies provide some evidence that clinics can have a positive impact in this area. The most widely quoted findings are from a study of school-based clinics in St. Paul, Minnesota.[3] The investigators reported substantial proportions of students using the clinics for reproductive health services, remarkably high contraceptive continuation rates and large decreases in birthrates. However, because of data limitations, it is not clear whether a real decline occurred; a more recent study of the St. Paul clinics did not reveal a significant impact on birthrates.[4]

Because public policy on school-based clinics should be based on research from

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more than one site,* the Center for Population Options began an evaluation in 1984 of a diverse group of clinics located in different parts of the United States. The project was designed to assess the students' use of clinic services and the clinics' impact on use of medical services generally. It also sought to determine what effect, if any, the clinics had on school absenteeism, illegal drug use, alcohol consumption, cigarette smoking, sexual activity, pregnancy rates and use of birth control methods. This article focuses on the reproductive health services offered by six school-based clinics and the impact of those services on students' sexual and contraceptive behavior.

The Clinics

When we were selecting study sites in 1984 and 1985, only 17 communities had school-based clinics in operation. The six clinics chosen for evaluation were in different parts of the country, in rural and urban communities and in different political and cultural milieus: Gary, Indiana; San Francisco; Muskegon, Michigan; Jackson, Mississippi; Quincy, Florida; and Dallas. The remaining clinics were excluded because they did not serve large enough proportions of the student population to have a significant impact, because they were participating in other evaluation projects that might conflict with this one, because we could not obtain approval from the school board or because we could not complete the necessary logistical arrangements in time.

By definition, all of the clinics were located on school grounds.† All six served low-income populations with large proportions of minority students (Table 1). In five of the six schools, the great majority of the students were black; in the San Francisco school, on the other hand, fewer than one-third of the students were black and substantial proportions were Hispanic and Asian. Four of the clinics had been open for at least three years when the study began; the oldest of these, the Dallas clinic, had been open for 14 years. The two remaining clinics, those in San Francisco and Quincy, opened after the study began; consequently, the study assessed their first two years of operation.

Every clinic employed at least one part-time or full-time physician and one or more part-time or full-time nurse practitioners. However, staff size varied considerably, from 10 full-time and two part-time staff at the Dallas clinic to 4–6 staff (mostly part-time) at the other sites. The clinics all provided primary health care, contraceptive counseling and pregnancy tests, but they differed considerably in the amount of emphasis they placed on reproductive health and in their provision of sexuality education and family planning services.

• *Gary.* The Gary clinic placed more emphasis on providing information and counseling and less emphasis on treating medical problems and writing prescriptions. Increasing the use of birth control methods and preventing pregnancy were not its major goals. The clinic did not bring up the subject of family planning, but if the students did, clinic staff would provide information and counseling, conduct pelvic examinations if appropriate and refer students to other family planning providers. The clinic itself did not prescribe or dispense contraceptives.

• *San Francisco.* The San Francisco clinic gave more emphasis to preventing pregnancy and curtailing the spread of AIDs and other sexually transmitted diseases (STDs). It had well-developed AIDS education and sexuality education programs; the former included an hour-long classroom presentation by a person with AIDS. The clinic educator gave classroom presentations on sexuality, trained peer

Table 1. Characteristics of schools and school-based clinics, by site

Characteristic	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
SCHOOL						
Enrollment*	1,700	1,800	800	700	800	1,100
Racial/ethnic composition (%)†						
Black	98	30	94	99	89	76
Hispanic	1	20	1	0	0	21
Filipino	0	37	0	0	0	2
White	0	3	4	0	11	1
Other	1	10	1	1	0	0
Total	100	100	100	100	100	100
CLINIC						
Date opened	1981	1985	1981	1979	1986	1970
Staff						
Physician	2‡	1‡	1‡	1‡	1‡	2§
Nurse practitioner	1	1	2‡	1‡	1	2
Nurse	0	0	0	1‡	0	1
Nurse assistant	0	0	0	0	0	2
Secretary/receptionist	1	1	1‡	0	1	2
Social worker	1	2‡	0	0	1‡	1
Health educator	0	1	1	1‡	0	0
Dentist	0	0	0	0	0	1
Dental hygienist	0	0	0	0	1‡	0
Nutritionist	1	0	0	0	0	0
Family planning services						
AIDS/sexuality education in classroom	No	Yes	Yes	No	No	No
Pregnancy testing/counseling	Yes	Yes	Yes	Yes	Yes	Yes
Contraceptive counseling	Yes	Yes	Yes	Yes	Yes	Yes
Contraceptive prescriptions	No	No	Yes*†	Yes	Yes	Yes
Contraceptive dispensation	No	No	No	Yes	Yes	Yes

*Enrollment at time of study, rounded to nearest 100.

†Based on student health survey data.

‡Part-time. §One full-time, one part-time.

*†Vouchers were issued to obtain contraception at a nearby family planning clinic.

*Another study, published in 1986, reported on a pregnancy prevention program in Baltimore that offered classroom presentations and counseling and arranged for a nearby clinic to provide reproductive health services. Younger students at the two experimental schools were more likely than those in the control schools to use contraceptives, and overall, participants in the experimental program had significantly lower pregnancy rates. (See: L. S. Zabin et al., "Evaluation of a Pregnancy Prevention Program for Urban Teenagers," *Family Planning Perspectives*, 18:119, 1986.)

†The only partial exception is the Quincy clinic. After being located on the school grounds for 18 months, the clinic (which was housed in a trailer) was moved—only about a hundred yards, but technically off the school grounds. However, students could still obtain passes to visit the clinic during the school day. This evaluation covers both the period when it was on the school grounds and the following six months, when it was "off campus." Data collected during the two periods were nearly identical.

counselors and counseled students in the clinic.

Despite its emphasis on reducing STDs and unintended pregnancy, the San Francisco clinic did not prescribe or dispense contraceptives, although it strongly encouraged students to use condoms (and sometimes pills, in addition) if they were having sex. When students asked for contraceptives, clinic staff referred them to other sources. Condoms were readily available in the community, both at drugstores and at a nearby community health clinic.

All of the clinic and school AIDS-prevention activities were strongly reinforced by the larger San Francisco community. San Francisco, which has one of the highest rates of AIDS in the United States, had implemented a variety of media programs and other public health efforts to help reduce the transmission of the human immunodeficiency virus (HIV). Students were exposed to a wide variety of public health messages promoting the use of condoms, including fairly graphic demonstrations of their proper use. Other clinics in the community, both public and private, made it a policy to give condoms to anyone who requested them; there was no requirement to register or complete any forms.

• *Muskegon.* Because of the high pregnancy rate in the Muskegon high school, both the school and the clinic devoted considerable attention to pregnancy prevention. The school health teacher devoted 2–3 weeks of class time to discussion of teenage pregnancy and STDs. In addition, the clinic staff implemented or coordinated a variety of sexuality education programs in the school. The clinic, which was administered by Planned Parenthood, did not prescribe or dispense contraceptives, but its staff provided consultation and education, conducted pelvic examinations and issued vouchers that students could use to obtain birth control pills at the nearby Planned Parenthood clinic. The education and counseling were thorough, but obtaining birth control pills often required four visits. Females could go directly to Planned Parenthood for pills, and males could obtain condoms there or purchase them in many neighborhood drugstores or gas station rest rooms; however, unless students went through the school clinic, they had to pay for services and contraceptives. Most of the high school students had come from a nearby middle school, which had a clinic that provided some education on sexuality and reproductive health.

• *Jackson.* The high school provided little sex education, but the Jackson clinic appeared to focus more on high-risk students and risk-taking behavior than did some of the other clinics. Sexually active students were identified during a psychosocial assessment completed at each student's first clinic visit. Appointments were promptly made with the nurse practitioner for counseling about abstinence and birth control methods and then with the clinic physician, who dispensed birth control pills and condoms. The clinic had an effective tickler system: If females using birth control pills did not return within two months for additional cycles of pills, they were asked to come to the clinic.

• *Quincy.* Because of high pregnancy rates in the Quincy community, family planning was given considerable emphasis in the school clinic. The clinic staff gave classroom presentations on sexuality, on health in general, and on the clinic and its services. During routine clinic visits, if students gave any indication that they might be having sex, the nurse practitioner asked questions to determine whether they were using contraceptives. If they were not, the nurse practitioner discussed abstinence and family planning methods with them and, if necessary, made appointments with appropriate clinic staff for the students to obtain one of the methods dispensed by the clinic. After the clinic had been in operation about six months, it set up a tickler system to assure that students returned for their family planning appointments. In general, the family planning protocols were thorough, and all students seeking care received it, but there were not enough staff to provide comprehensive care to large numbers of students.

• *Dallas.* The oldest school-based clinic in the country, the Dallas clinic was also the largest in both space and staffing. Unlike the other clinics in this study, it served all 12–18-year-olds, whether or not they attended the high school in which the clinic was located. All entering students were given appointments for a health maintenance examination, which included visits with the physician or nurse practitioner, social worker, screening nurse and dentist. During these visits, staff discussed a wide range of potential medical and psychosocial problems with the students. Issues involving sexuality were discussed at this time and during any other routine visit. Staff counseled students about abstinence and birth control and provided an appropriate method to females who wanted a contraceptive. No follow-up appointments were made and there was no follow-up system, but students were encouraged to return when they needed additional supplies.

These six clinics differed from one another, and as a group they also differed in two important ways from the current universe of school-based clinics. First, five of the clinics were located in schools in which the majority of the students were black; nationally, school-based clinics serve populations with larger proportions of white students than did the clinics studied here. Second, three of the six clinics dispensed contraceptives, while only 21 percent of school-based clinics across the country currently do so.[5] These differences must be considered when generalizing the findings reported here to all school-based clinics; the six sites we studied are not representative of current clinics, but they do constitute a heterogeneous group of clinics reflecting the diversity of clinics nationwide.

Methods

To assess the reproductive health services provided by the clinics and to evaluate the impact of those services, we used data from two primary sources: clinic records and a student health survey. Site visits and interviews with staff provided additional information. Each clinic kept records of the number of clinic users, the number of clinic visits, the number and type of family planning visits and, depending on the particular clinic, the number of students given vouchers for contraceptives or the number of students given contraceptives. These were tallied for the 1985–1986 academic year or, when possible, for the 1986–1987 academic year. The student health survey, which provided information on all the students in each school (or samples thereof), included questions about use of the clinic that could be compared to or integrated with the clinic record data as well as questions about sexual activity that could be used to measure the impact of the clinic.

To evaluate the impact of each clinic, we needed some means of comparing student populations in schools with clinics to student populations in schools without clinics. Random assignment to treatment and control conditions (clinic and nonclinic schools) was obviously not possible; therefore, for each of the four clinics that were operating when the project began—Gary, Muskegon, Jackson and Dallas—we identified a comparison school that had similar social and demographic characteristics (e.g., socioeconomic status and race) and was located as close as possible to the clinic school.

Because the other two schools included in the evaluation—San Francisco and Quincy—had not yet opened their clinics when the study began, we were able to collect preclinic baseline data and two-year postclinic data for them. This was not a longitudinal study in which the same students were surveyed both times; rather, the survey data provided a cross-sectional "snapshot" of the student population before the clinic opened and a second snapshot two years later. Some students were undoubtedly included in both samples, but during the two years between surveys, many new students entered the schools and many others graduated or left school for other reasons.

The sampling frame varied from school to school. In most, the sample was selected from the entire student body, but in the Gary and San Francisco schools, which had 1,700 students or more, we selected samples of classes, stratified by grade level and level of instruction.

Procedures for obtaining parental consent for survey participation also varied from school to school. At most schools, parents were notified in writing and given the opportunity to exclude their child's participation (passive consent). Because fewer than five parents in each of the schools at these sites did so, this would not have produced any bias. In San Francisco, consent procedures changed from passive consent for the baseline survey to active consent for the second survey, and various problems (including an immediate deadline) prevented many students from obtaining written consent. In Jackson, a requirement to obtain active parental consent reduced the potential sample in both the clinic and the comparison school; however, the comparability of the samples should not have been compromised, because both schools required the same procedure.

In Gary, Jackson and Dallas, the survey was administered first in one school and then immediately in the other. In Muskegon, the survey was administered in the comparison school about six months after it was administered in the clinic school. Finally, in both San Francisco and Quincy, the two rounds of the survey were administered almost exactly two years apart.

We used a comprehensive health survey designed to measure social and demographic characteristics, clinic use, use of medical services in general, risk-taking behavior, sexual activity, contraceptive use and pregnancy. Different versions of this questionnaire were used at different sites, but all versions contained the same set of questions on sexual behavior. The initial version focused on sexuality, but was revised during the second year to cover a wider variety of health issues.

The survey questions on sexuality, some of which were taken from previous studies, were pretested with three five-member groups of students for comprehension and clarity of items. To measure the test-retest reliability of the survey, we administered it twice, two weeks apart, to one group of 87 students. The test-retest coefficients of agreement and the correlation coefficients indicated that the items had adequate reliability.[6]

There is reason to believe that the data on sexual activity and use of birth control are also valid. First, the survey data on sexual behavior and contraceptive use were consistent with previously published findings from similar studies.[7] Second, survey data on use of the clinic for contraceptives were consistent with clinic data. However, pregnancy data should be interpreted cautiously. Some students may not wish to report a previous pregnancy (particularly if it ended in abortion), and a few teenagers may define a previous pregnancy as such only if it resulted in a live birth. In addition, some teenagers who conceived while in high school subsequently dropped out and were not present to complete a questionnaire. Nevertheless, there is no reason to expect reporting biases to have a stronger effect on results from either the clinic school or the comparison school, except possibly in Jackson, where a day-care program may have increased the proportion of teenage mothers who remained in school.

The proportion of each school's total student enrollment that completed the questionnaire varied from 24 percent to 90 percent. The response rates were reduced by intentional sampling of students in Gary and San Francisco, the need to obtain active parental consent in Jackson and San Francisco, inflated enrollment figures that retained names of dropouts at some of the sites, high rates of absenteeism at most of the sites and the exclusion of educable mentally disabled students who may not have been able to complete the questionnaire reliably. The response rates, based on the number of students who actually attended class the day of the survey and who had parental permission to participate, ranged from 90 percent to 98 percent, and the survey data should be representative of these students.

Although the comparison schools in Gary, Muskegon, Jackson and Dallas were selected to resemble the clinic schools as closely as possible, the schools being compared differed in some social and demographic characteristics. Likewise, in San Francisco and Quincy, there were some differences between the baseline and two-year samples. Therefore, for the outcome data reported in this article, we modified the samples to make the background characteristics of the clinic and nonclinic samples more similar. First, in the five sites that had very large percentages of black students (all sites except San Francisco), all nonblack students were omitted from the analysis; this made the racial composition of the clinic and nonclinic samples identical and eliminated any possible interaction effects between race and outcome variables. Second, in San Francisco, the two-year posttest sample was weighted so that its racial composition was equivalent to that of the baseline sample. After these two modifications were made, the clinic-school and comparison-school samples did not differ significantly on a majority of the background characteristics. Where differences did exist, they suggested that the students in the comparison schools were slightly more advantaged than the students in the clinic schools.*

We used multiple regression techniques to control for any impact these remaining differences might have on outcome variables. The regression coefficients reported in the tables measure the relationship between being in a clinic school and various outcome variables, statistically controlling for the following background characteristics: age, number of parents in the home, receipt of food stamps, receipt of free

*There were statistically significant differences between the clinic and comparison samples on 27 of 66 characteristics. In Jackson, the proportion of females in the clinic sample was significantly higher than in the comparison sample (61 percent vs. 52 percent). In Muskegon, Jackson and Dallas, the students in the clinic schools were significantly older than the students in the comparison schools (mean difference, 2–3 months); they were less likely to have two parents in the home and were more likely to receive income from welfare and social security and to receive free lunches and food stamps. In Gary and Jackson, students in the comparison schools had higher grade-point averages, but the absolute differences were very small (0.1 on the traditional 4.0 scale). In Muskegon and Dallas, students in the comparison schools were more likely to report a desire to continue their education beyond high school (66 percent vs. 55 percent and 46 percent vs. 40 percent, respectively). In San Francisco, during the two years between the surveys, the proportion of students in homes receiving food stamps decreased from 11 percent to eight percent. During the equivalent period between surveys, Quincy's economy improved, possibly explaining the significant decreases in the proportions of families receiving food stamps and free lunches (by seven percentage points and 13 percentage points, respectively).

Table 2. Total number of clinic visits and percentage made for reproductive health care, by type of care, according to site

Visits and type of care	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Total visits (N)	2,791	2,357	1,859	3,341	4,399	4,489*
Visits for reproductive health care (%)	15	9	27	37	30	38
Contraceptive counseling, prescription and/or dispensation	8	4	25	28	24	14
Pregnancy test	2	2	2	3	na	8
Prenatal care	na	na	na	2	3	3
STD testing	4	1	na	na	na	1
General gynecology	1	2	na	4	3	12

Note: Based on clinic records; na=not applicable.

*Visits from students at clinic school; another 6,000 visits were from other adolescents.

lunches, grade point average and academic plans.*

The communities in which the schools were located might also have varied in ways that would have different effects on the clinic and comparison schools. In Gary, Jackson and Dallas, the clinic schools and their respective comparison schools were reasonably close to one another and there were no known programs that would have had a major impact on the students.

In Quincy, before the school-based clinic opened, students received passes from the school to attend a nearby public health clinic that provided reproductive care. When that clinic moved several miles away, students could no longer attend it, and the public health department opened the school clinic. Thus, in Quincy, this study measures the differences between the impact of services provided at the school and that of services the students had previously received at the public health clinic.

At two other sites, the issue of possible confounding factors was more complex. In San Francisco, the community changed dramatically during the two years covered by the evaluation. AIDS became a far more salient issue, and the community implemented numerous programs to help reduce HIV transmission. Moreover, condom use increased substantially among adolescents nationwide during this time,[8] and we would expect this increase to be greatest in areas where AIDS was a prominent public health issue. The comparison school for the Muskegon site was 90 miles away, and it is difficult to know in what ways the communities might have differed. Moreover, the comparison school had a strong sex education program that may have affected contraceptive use. Finally, the Muskegon surveys were administered at the clinic and nonclinic schools at two different times of the year—in the spring and fall, respectively. Therefore, in these two communities, it is more difficult to attribute differences between the clinic school and the comparison (or preclinic) school to the school clinics.

Services Provided

These school-based clinics were comprehensive clinics designed to provide a variety of needed health services to adolescents. Both clinic records and survey data confirmed that the clinics provided health care to many students: In five sites, at least 60 percent of the students had used the clinic, and in Dallas, 83 percent of the students had done so. Only in the San Francisco school had fewer than half (48 percent) of the students ever used the clinic, which had been open only two years. Furthermore, in four sites, at least 63 percent of the students had used the clinic during the preceding year. At four of the sites, students made 2,400–4,400 visits per year. In Muskegon, however, there were only 1,859 visits to the clinic, while in Dallas, which had 4,489 student visits, there were 6,000 more visits by adolescents who did not attend the clinic school. Of those students who used the clinic, about half visited it one or two times per year.

As discussed previously, the clinics varied in the extent to which they addressed reproductive health. This is demonstrated by the proportion of all visits to the clinic that were for reproductive services and in the proportion of all students in the school who used the clinic for such services. Of all the visits, 9–38 percent were for reproductive health in general; the proportions of visits specifically for family planning were much smaller and reflected the types of services available (Table 2). In the Gary and San Francisco clinics, which did not prescribe or dispense contraceptives, eight percent and four percent of the visits, respectively, were for counseling and referral; in Muskegon (which provided counseling, vouchers for contraceptives, and referral), the proportion was 25 percent. In the Jackson, Quincy and Dallas clinics, which provided counseling and dispensed contraceptives, the proportions ranged from 14 percent to 28 percent. These figures indicate that family planning was an important component of the clinics that provided vouchers for or dispensed contraceptives.

The proportions of students using the clinics for contraceptive services also varied greatly according to the services available. In Gary and San Francisco, which did not dispense contraceptives, only five percent and three percent of the students, respectively, used the clinic for contraceptive counseling (data not shown). In contrast, 21 percent of the Muskegon students used the clinic for contraceptive counseling and 17 percent obtained contraceptive vouchers from the clinic; in Jackson, Quincy and Dallas, the proportion of students who obtained contraceptives from the clinic ranged between 22 percent and 26 percent.

In the four schools that provided contraceptives (or vouchers), the proportion of sexually experienced female students who obtained contraceptives through the clinics varied from 23 percent (N=67) in Muskegon to 40 percent (N=182) in Dallas. The proportion of sexually experienced males in those schools who obtained condoms from the clinics ranged from 12 percent (N=41) in Muskegon to 18 percent (N=93) in Quincy. The proportions for males are lower than those for females, probably because condoms could be obtained without a doctor's prescription and because efforts to increase use of contraceptives focused on females.

These percentages should be viewed cautiously. Although the numerator includes all students who ever used the clinic to obtain contraceptives, some may have used the clinic only a few times, and probably only a small proportion received continuous contraceptive coverage through the clinic. Therefore, the numerator may overestimate coverage of the students. On the other hand, the denominator includes all sexually experienced students, even

*Using three criteria—factor loadings, skewedness of each distribution, and relative reliability and validity—we conducted a factor analysis to reduce a list of 12 variables to this group of six. Further regression analyses indicated that after we controlled for these six characteristics, additional variables did not significantly increase the amount of variance explained.

those who had sex only once and did not subsequently need contraceptives; consequently, the resulting percentage may underestimate the clinics' coverage of sexually active students.

An analysis of clinic records indicated that a substantial proportion of female students who obtained birth control pills either did not return to the clinic for prescriptions for subsequent cycles of pills or did not return in time to allow continuous contraceptive coverage for six months or more. They may have stopped having sex, graduated or left school for other reasons, obtained contraceptives elsewhere or simply had unprotected sex. In any case, substantial proportions of young women did not obtain cycles of pills from the clinics often enough to allow continuous coverage.

Sexual Activity

The data from the student health survey was used to assess the impact of the school-based clinics on sexual activity among students at those schools. Three questions concerned sexual activity: "Have you ever had sex?" and, if so, "How old were you when you first had sex?" and "How many times have you had sex within the past four weeks?" The resulting data were first analyzed using chi-square or t-tests (Table 3); then multiple regression was used to control for the respondents' background characteristics (Table 4, page 12). The analyses of age at first intercourse and frequency of intercourse were limited to sexually experienced students.

• *Ever had sex.* When chi-square analysis was used to compare the proportions of students at the clinic schools and the matched nonclinic schools who had ever had sex, there were no significant differences among either males or females at five sites, but an analysis of post data for the San Francisco clinic revealed that females (but not males) were significantly more likely to have had sex than they had been before the clinic opened ($p<.05$). In Dallas, males at the clinic school were less likely to have had sex, but the difference fell just short of significance ($p=.06$).

The regression results were somewhat different. At three of the sites, there were no significant differences between the clinic and nonclinic schools in the proportion of males or females who had ever had sex. However, in San Francisco, the difference among females found in the chi-square analysis remained significant ($p<.05$). In Muskegon, a significantly smaller proportion of female students in the clinic school than in the comparison school had ever had sex ($p<.05$). And in Dallas, with respondents' background characteristics controlled, the difference between males at the clinic school and those at the comparison school became significant ($p<.01$).

Table 3. Measures of sexual activity among high school students, by gender, according to site and presence of clinic

Measure and gender	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Ever had sex												
Males												
N	294	274	426	204	432	183	242	119	315	235	432	175
%	87	82	63	58	93	91	93	96	92	91	92	87
Females												
N	341	386	420	226	497	248	273	190	283	352	449	218
%	60	63	37	46*	72	69	75	82	82	82	76	80
Age at first intercourse†												
Males												
N	251	220	238	115	u	u	218	110	286	206	379	148
Mean	12.7	12.5	13.3	13.3	u	u	11.5	12.0	11.7	11.9	11.4	12.4**
Females												
N	201	238	145	101	u	u	196	153	230	285	334	168
Mean	14.8	14.4	15.0	14.8	u	u	14.3	14.8**	14.3	14.3	14.4	14.4
Frequency of sex in last 4 weeks†												
Males												
N	246	222	247	110	382	156	221	109	272	202	375	137
Mean	2.8	2.6	2.9	2.4	4.2	3.7	3.7	3.6	3.3	3.8	3.2	3.2
Females												
N	197	239	151	98	346	166	196	148	223	280	316	164
Mean	1.8	2.1	3.3	2.1	2.6	2.5	2.8	2.2	2.5	2.9	2.2	2.5

*Difference significant at $p<.05$, as determined by χ^2 test.

**Difference significant at $p<.01$, as determined by t-test.

†In this and subsequent tables, analysis restricted to sexually active students.

Notes: To control for race, the results in tables 4–9 for all sites except San Francisco are based on blacks only. For San Francisco, the postclinic data are weighted to equal the racial distribution of the preclinic sample; u=unavailable.

• *Age at first sex.* When t-tests were used to compare mean age at first intercourse, two sites had significant differences. In Jackson, females at the clinic school were slightly older at first intercourse than those at the comparison school (14.8 years vs. 14.3 years; $p<.01$). Males in the clinic school in Dallas were one year older at first intercourse than males at the comparison school (12.4 years vs. 11.4 years; $p<.01$); as Table 4 shows, this difference remained significant when background characteristics were controlled ($p<.001$).

The mean age at first intercourse at these sites indicates that many of the students surveyed were sexually experienced before entering high school. Because it is improbable that the school-based clinics affected the sexual activity of students before they attended the clinic schools, we performed an additional analysis that excluded students who were sexually experienced before entering high school and that merged the male and female samples (to increase the sample size). Regression analyses (not shown) indicated no differences between the clinic and nonclinic schools in the proportions of students who had become sexually experienced after entering high school.

• *Frequency of sex.* Neither t-tests nor multiple regression found significant differences between the clinic school and the comparison school at any site in the frequency of sexual activity during the four weeks before the survey.

Contraceptive Use

We evaluated the impact of the clinics on the students' use of contraceptives by asking those who were sexually experienced whether they or their partner had used any method at last intercourse (including rhythm or withdrawal), and more specifically, whether they had used condoms or pills. The results were analyzed first through chi-square tests (Table 5, page 12) and then through multiple regression to control for background characteristics (Table 6, page 13).

Table 4. Unstandardized regression coefficients, by measure of sexual activity and gender, according to site

Measure and gender	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Ever had sex						
Males						
N	558	589	596	353	538	595
Coefficient	–.05	–.08	–.02	.01	–.00	–0.7**
Females						
N	720	615	729	458	624	658
Coefficient	.04	.11*	–.08*	.04	.01	.03
Age at first intercourse						
Males						
N	464	332	u	321	481	521
Coefficient	–.25	.09	u	.50	.05	.95***
Females						
N	435	230	u	345	505	498
Coefficient	.09	–.01	u	.32	.13	.03
Frequency of sex in last 4 weeks						
Males						
N	461	332	521	322	463	507
Coefficient	–.16	–.79	–.42	–.56	.22	.08
Females						
N	432	234	500	340	495	476
Coefficient	.35	–.99	–.32	–.68	.21	.03

*Difference between clinic and nonclinic school significant at p<.05, as determined by "change in F" test.

**Difference between clinic and nonclinic school significant at p<.01, as determined by "change in F" test.

***Difference between clinic and nonclinic school significant at p<.001, as determined by "change in F" test.

• *Any method.* Neither analysis found significant differences between the clinic school and the matched nonclinic (or preclinic) school in Gary, San Francisco, Jackson or Quincy. However, chi-square tests revealed that in Muskegon, males and females in the clinic school were significantly more likely to have used a method the last time they had sex than were those in the comparison school (p<.001). In Dallas, females in the clinic school were significantly less likely than females in the comparison school to have used a method the last time they had sex (p<.05). This resulted primarily from more use of rhythm and withdrawal by students at the comparison school (data not shown). Multiple regression produced the same results.

• *Condoms.* Neither analysis found significant differences at Gary, Jackson, Quincy or Dallas. However, chi-square analysis revealed significant differences at two sites. In San Francisco, the proportions of males and females in the postclinic sample who reported condom use were significantly higher than the proportions among their preclinic counterparts. The proportion of males who reported having used condoms at last intercourse increased from 29 percent to 56 percent (p<.001), and the proportion of females who reported that their partners had used condoms at last intercourse rose from 22 percent to 38 percent (p<.001). In Muskegon, the proportion of males who reported using condoms was significantly larger at the clinic school than at the comparison school (61 percent vs. 41 percent; p<.001).

Multiple regression revealed similar differences at those sites. In San Francisco, the differences between the preclinic and postclinic samples remained significant among both males and females (p<.001 and p<.01, respectively). In Muskegon, both males and females at the clinic school were significantly more likely than their counterparts at the comparison school to have used condoms at last intercourse (p<.001 and p<.05, respectively).

• *The pill.* The data from San Francisco, Gary, Quincy and Dallas revealed no measurable differences between the clinic and nonclinic (or preclinic) schools. Moreover, chi-square tests found no significant difference at any site in the proportion of males reporting that their partners used the pill. However, the proportion of females who reported using the pill at last intercourse was higher in the clinic school than in the nonclinic school in Muskegon (36 percent vs. 27 percent; p<.05) and in Jackson (46 percent vs. 30 percent; p<.01).

The regression results were somewhat different. The difference in pill use among females remained significant in Jackson (p<.05), but not in Muskegon. However, in Dallas, the proportion of males who reported that their partner was using the pill at last intercourse was significantly lower in the clinic school than in the comparison school (p<.05).

• *Clinic users and nonusers.* Comparisons also were made between clinic users and

Table 5. Measures of contraceptive use at last intercourse among high school students, by gender, according to site and presence of clinic

Measure and gender	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Used any method												
Males												
N	242	221	256	117	387	165	222	113	210	287	389	144
%	69	65	65	74	61	78***	58	60	70	73	68	60
Females												
N	202	239	150	104	358	168	199	153	230	287	333	169
%	61	68	67	75	60	75***	61	70	74	81	74	63*
Used condom†												
Males												
N	242	221	256	117	387	165	222	110	210	287	389	144
%	52	48	29	56***	41	61***	39	40	57	53	33	36
Females												
N	202	240	150	104	358	168	199	153	230	287	333	169
%	27	31	22	38***	22	29	25	20	46	48	18	16
Used the pill†												
Males												
N	242	221	257	117	387	165	222	110	210	287	389	144
%	10	12	17	24	10	10	18	15	23	28	15	9
Females												
N	202	240	157	104	358	168	199	153	230	287	333	169
%	23	30	18	25	27	36*	30	46**	29	36	32	30

*Difference significant at p<.05, as determined by χ^2 test.

**Difference significant at p<.01, as determined by χ^2 test.

***Difference significant at p<.001, as determined by χ^2 test.

†In this and Table 6, condom use reported by females and pill use reported by males refer to use by their partners.

nonusers in the clinic schools in Jackson, Dallas and Quincy (data not shown). At all three sites, students who used the clinic for contraceptives were significantly more likely to have used condoms or pills the last time they had sex than were students who did not use the clinic for contraceptives. Nevertheless, at all three sites, substantial proportions of students who had not made a clinic visit for contraceptives used condoms or pills.

In Jackson, 77 percent of the students who had ever used the clinic to obtain contraceptives used condoms or pills at last intercourse, compared with 48 percent of the students who had not done so. In Quincy, these proportions were 76 percent and 61 percent, while in Dallas they were 67 percent and 32 percent, respectively. Regression analysis confirmed the significance of these findings.

These results should be interpreted with caution, as they are undoubtedly biased by self-selection. The students visiting the clinic for contraceptives were likely to be highly motivated individuals who would have used a method even if they had to go elsewhere to obtain it.

• *Alternative sources of contraceptives.* Our findings have shown that at sites where contraceptives were prescribed or dispensed, substantial proportions of sexually experienced students used the clinics for contraceptives and that students who used the clinics for contraceptives were significantly more likely to have used condoms or pills the last time they had sex than were students who did not use the clinics for family planning. This raises the question: Why didn't those clinics demonstrate a larger impact on the contraceptive behavior of sexually experienced students in their respective schools?

The results of another analysis indicate that the primary reason the clinics did not demonstrate a stronger and more consistent impact on contraceptive use lies in provider substitution (Table 7, page 14). In Muskegon, Jackson and Dallas, sizable proportions of students attending the comparison schools (which did not have clinics that prescribed or dispensed contraceptives) used contraceptives when they had sex, but they were more likely than students in the clinic schools to obtain contraceptives from a community family planning clinic or drugstore.

And in Quincy, there was a dramatic drop (from 35 percent to seven percent) in the proportion of sexually experienced students who obtained contraceptives from the health department after the school clinic opened. During the first year after the opening of the school clinic, health department records showed a loss of about 100 female clients, and the school clinic served about 100 more female students. Although these probably were not exactly the same 100 females, the results indicate that the school clinic did absorb health department clients who were students and are consistent with the survey findings reported above.*

To further investigate this substitution effect, we asked students at the clinic schools in Muskegon, Jackson and Dallas where they would go to get contraceptives if there were no school clinic. At those sites, 78–85 percent of the students said they would find another source (another clinic, a doctor or the drugstore), 6–13 percent said they would have sex without using a contraceptive and 4–5 percent said they would refrain from sexual intercourse if there were no clinic at school. Males at all three sites were more likely than females to plan to have sex without using a contraceptive (not shown).

• *Reasons for not using contraceptives.* The failure of some clinics to increase the use of contraceptives among students is also partly explained by an analysis of the reasons why students have sex without using birth control. Sexually experienced students at four sites—Gary, San Francisco, Jackson and Dallas—were asked if they had ever had intercourse without using a contraceptive method and, if so, why. They were asked to check all listed reasons that might apply. Students in the clinic schools were not significantly less likely to check any of the potential reasons for not using birth control than were students in the comparison (or preclinic) schools. That is, clinic presence did not appear to reduce the importance of any of the reasons.

The two most commonly identified reasons were "Didn't expect to have sex" and "Just didn't think pregnancy would occur." Most of the reasons were not related to access to contraceptives, but to the fact that sex was not anticipated, to perceptions of low risk of pregnancy or to questions of motivation. Others were related to lack of knowledge, to fear of contraceptives or of parents' reactions, or to a desire

Table 6. Unstandardized regression coefficients, by contraceptive use at last intercourse and gender, according to site

Contraceptive use and gender	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Used any method						
Males						
N	456	346	534	327	485	527
Coefficient	−.04	.08	.18***	.05	.00	−.08
Females						
N	437	237	513	348	505	498
Coefficient	.06	.07	.16***	.07	.02	−.10*
Used condom						
Males						
N	458	346	534	314	486	527
Coefficient	−.04	.27***	.20***	.06	−.03	.05
Females						
N	439	237	514	350	505	498
Coefficient	.05	.16**	.10*	−.04	.01	−.00
Used the pill						
Males						
N	458	346	534	314	486	527
Coefficient	.02	.04	.00	−.03	.01	−.07*
Females						
N	439	237	513*	345	505	498
Coefficient	.04	.07	.08	.13*	.03	−.05

*Difference between clinic and nonclinic school significant at p<.05, as determined by "change in F" test.
**Difference between clinic and nonclinic school significant at p<.01, as determined by "change in F" test.
***Difference between clinic and nonclinic school significant at p<.001, as determined by "change in F" test.

*Additional information from the Quincy sample in the postclinic survey indicated that sexually experienced students who usually obtained their contraceptives from the school clinic were not more likely to have used birth control the last time they had sex than were those who usually obtained their contraceptives from the drug store, a doctor or the health department. However, of those who obtained contraceptives from these institutional sources, 81–86 percent had used some type of birth control at last intercourse, compared with 51 percent of those who said they obtained contraceptives from other sources, primarily friends. Students who rely on their friends for contraceptives may be at an earlier stage in their sexual and contraceptive careers and may not have established patterns of obtaining contraceptives themselves.

Table 7. Percentages of sexually active students, by source of contraceptives used at last intercourse, according to site and presence of clinic

Source	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic (N=432)	Clinic (N=443)	Pre-clinic (N=384)	Post-clinic (N=207)	Non-clinic (N=663)	Clinic (N=333)	Non clinic (N=422)	Clinic (N=259)	Pre-clinic (N=709)	Post-clinic (N=552)	Non-clinic (N=709)	Clinic (N=306)
School clinic	na	na	na	na	na	17*	na	30	na	34	na	30
Family planning clinic	14	18	7	7	20	13	15	10	†	†	18	5
Doctor	5	9	†	†	5	10	7	5	†	†	†	†
Health department	†	†	†	†	†	†	†	†	35	7	†	†
Hospital clinic	1	1	4	9	3	3	5	1	†	†	4	1
Drugstore	32	26	18	27	12	9	19	9	15	15	12	5
Friend/relative	6	7	6	10	10	15	9	8	9	6	11	2
Other	1	2	2	1	1	2	1	1	3	2	1	2
Not applicable (used withdrawal or rhythm)	5	2	21	10	10	7	3	1	7	10	19	13
Used no method	36	35	36	26	39	24	41	35	28	24	30	39

*Received vouchers that were redeemed at local family planning clinic.

†Information not collected at these locations.

Note: na=not applicable.

not to reduce pleasure. There was no indication from these answers that sexually experienced students from the clinic schools were more knowledgeable about pregnancy prevention or more comfortable with contraceptive use than students in the comparison schools.

Pregnancy

Students at all six sites were asked whether they had ever been pregnant or caused a pregnancy and whether they had been pregnant or caused a pregnancy within the last 12 months. The first question measures the impact of the clinic on all years a student spent at the clinic school and counts pregnancies among females who gave birth and returned to school, while the question about pregnancy during the last 12 months is more likely to eliminate any pregnancy that may have occurred before a student attended the clinic school.

Clinic presence was not associated with lower rates of pregnancy at any of the sites, either during the previous 12 months or at any other time (Table 8). In Dallas, the proportion of females who reported they had ever been pregnant was higher at the clinic school than at the comparison school. However, this difference was not significant when background variables were controlled (not shown).

• *Timing of pregnancies and clinic use.* At most sites, the student health survey asked students who had ever been pregnant (or caused a pregnancy) if they had ever used the school clinic, discussed contraception with clinic staff or received contraceptives from the clinic before their pregnancy.

As Table 9 (page 16) shows, 44–90 percent of the students who had become pregnant or had caused a pregnancy had done so before those students had ever attended the clinic. The Dallas clinic had the largest proportions—48 percent of the males and 56 percent of the females—of students who had been to the clinic prior to conception, possibly because the clinic gave routine maintenance examinations to all incoming students. Even so, almost half of the students who had become pregnant or had caused a pregnancy had done so before they visited the clinic. Some of the pregnancies may have occurred before those students attended the clinic school, but this cannot be determined from the data.

Of the students who had become pregnant or had caused a pregnancy, 62–89 percent had done so before receiving contraceptive counseling from clinic staff, and 68–82 percent of the pregnancies had occurred before the students obtained contraceptives from the clinic. Overall, about one-quarter of the pregnancies occurred after the students had obtained contraceptives from the clinic.

Discussion and Recommendations

These school-based clinics were not primarily family planning clinics, but were comprehensive health clinics that provided primary care and varying degrees of family planning services. Reproductive health accounted for a minority of student visits, but was an important component of clinic services. Clinics that prescribed or dispensed contraceptives served far more students than those that provided only counseling, and the three that dispensed contraceptives on-campus served higher proportions of sexually experienced females than the one that provided vouchers. Finally, the clinics provided contraceptives to much larger proportions of females than of males.

Much of the debate over school-based clinics has focused on whether contraceptive counseling and provision hasten the initiation or increase the frequency of sexual activity. Our results indicate that this is not the case: At most sites, there were no significant differences between clinic and nonclinic schools; when significant differences did occur, most commonly the data showed less sexual activity among students attending the clinic school.

An examination of each clinic's services provides an interesting perspective on the differential impact of the clinics on use of birth control. The Gary clinic school, which had no measurable effect on contraceptive use, did not emphasize pregnancy prevention, did not prescribe or dispense family planning methods and saw few students for contraceptive counseling or referral.

At the San Francisco school, however, condom use (but not pill use) increased significantly over time. In that school, the clinic developed a strong AIDS education program and a peer education program and encouraged condom use. Nevertheless, the clinic could neither prescribe nor dispense contraceptives, and few students used it for counseling or referral. During the two years between the pretest and the posttest, AIDS became a salient issue throughout San Francisco, and students were exposed to a wide variety of public health campaigns promoting condom use; during the same period, condom use in-

creased substantially among adolescents nationwide.[9] It is probable that some combination of clinic, school and community interventions contributed to increased condom use, but it is impossible to determine which of these had the greatest impact on the students' behavior.

Muskegon was the only site at which there were significant differences between the clinic school and the comparison school on all three measures of contraceptive use. This clinic, the only one administered by Planned Parenthood, gave considerable emphasis to preventing pregnancy. In the classroom, the health education teacher and clinic staff gave presentations on human sexuality, while in the clinic, staff gave individual consultation on family planning and reproductive health and provided vouchers so that students could obtain pills and condoms without charge at a local family planning clinic.

However, it is not clear why contraceptive use was higher at the clinic school than at the comparison school. Both schools had a strong sex education program, so the effect of this factor is questionable. Moreover, few females and only about 12 percent of the sexually experienced males at the clinic school used the clinic to obtain condoms, calling into question whether the vouchers provided by the clinic produced the large difference in condom use. Finally, there were two methodological limitations: The distance between the two schools was large (90 miles), and the survey was not given at the same time of year at both schools.

Of all the clinic schools, Jackson had the highest proportion (46 percent) of sexually active female students who had used the pill at last intercourse. Moreover, that proportion was more than 50 percent higher than the figure at the comparison school. It is likely that the clinic program contributed to these differences. The clinic placed little emphasis on condoms, but it administered risk assessments to students who came to the clinic, followed up students who were engaging in unprotected sex, dispensed the pill on site and followed up females who received it. It had the largest proportion of visits made for family planning and the second largest proportion of sexually experienced females receiving contraceptives from the school clinic.

At Quincy, the proportion of females using pills the last time they had sex rose by seven percentage points in the two years after the clinic opened, but that increase was not statistically significant. At first consideration, this finding is disappointing, because the Quincy clinic gave considerable emphasis to pregnancy prevention and the school itself provided sexuality education both before and after the clinic opened. In the clinic, staff asked students about unprotected sexual activity, dispensed contraceptives and contacted students who missed family planning appointments.

Two factors probably explain why the clinic did not have a greater impact on contraceptive use. First, before the clinic opened, students already had access to family planning services through the nearby health department clinic. Second, during its first two years, the clinic had few staff and considerable turnover, which limited its outreach efforts and the number of students it could serve.

At the Dallas clinic school, approximately 40 percent of the sexually experienced female students received the pill through the clinic; nevertheless, they were not significantly more likely to have used the pill at last intercourse than their counterparts at the comparison school. The reasons for this are not clear; however, this clinic differed from the more successful clinics in two major ways. Although the clinic provided health care to many students, it did not focus on pregnancy prevention. Staff did not make follow-up appointments when they dispensed the pill, and did not check on patients when their cycles of pills would have run out.

In sum, simply providing contraceptives was not enough to significantly increase their use. School and community programs may have increased condom use in at least one site, and a combination of education, counseling, contraceptive provision and careful follow-up may have increased pill use in at least two schools.

Our data did not provide evidence that the presence of any of the school-based clinics reduced the school-wide pregnancy rate. These findings are consistent with the findings on use of birth control methods at sites where there were no significant differences in use of birth control, but they are disappointing in San Francisco, Muskegon and Jackson, where there were such differences. However, in San Francisco and Jackson, this may be explained in part by the fact that the significant differences were in use of specific methods rather than in use of any method of birth control.

Possible validity problems associated

Table 8. Percentages of sexually active high school students who caused a pregnancy or experienced one, by gender, according to site and presence of clinic

Measure	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Males												
Ever caused pregnancy												
N	238	216	248	110	363	163	221	112	209	271	354	117
%	14	17	16	12	13	12	12	18	11	7	18	11
Caused pregnancy in last 12 months												
N	227	207	232	110	401	167	196	104	209	276	335	116
%	7	10	10	8	8	8	6	11	7	6	7	10
Females												
Ever pregnant												
N	201	240	149	102	354	168	204	154	229	285	318	169
%	27	21	24	26	20	24	21	25	15	15	18	27*
Pregnant in last 12 months												
N	196	235	147	101	360	172	196	151	228	280	315	169
%	20	11	16	16	14	15	12	14	10	8	10	14

*Significant at $p<.05$, as determined by χ^2 tests.

Table 9. Percentages of students at clinic schools who were ever pregnant (or caused a pregnancy), by timing in relation to clinic use, according to site and gender

Timing of pregnancy	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Female (N=53)	Male (N=32)	Female (N=20)	Male (N=10)	Female (N=40)	Male (N=21)	Female (N=39)	Male (N=19)	Female (N=45)	Male (N=19)	Female (N=48)	Male (N=21)
Before using clinic for any reason	77	81	90	80	70	62	64	68	u	u	44	52
Before discussing birth control in the clinic	89	84	80	80	65	81	77	74	u	u	62	67
Before receiving prescription/ voucher for contraceptives from clinic	na	na	na	na	77	90	79	na	na	na	na	na
Before obtaining contraceptives from the clinic	na	na	na	na	na	na	82	68	76	79	77	76

Notes: Data are from student health survey and include all students who were ever pregnant or caused a pregnancy regardless of race; na=not applicable; u=unavailable.

with self-report of pregnancy and possible dropouts because of pregnancy may have obscured some clinic impact on pregnancy rates. Furthermore, although many of the students who obtained contraceptives from the clinics might have obtained them from some other source if the clinic had not provided them, not all of them would have done so. Thus, the four clinics that provided contraceptives or vouchers probably helped prevent small numbers of pregnancies, although this effect was not large enough to significantly affect school-wide pregnancy rates.

The clinic and survey data discussed above suggest strategies for improving the effectiveness of school-based clinics. These include:

• *Give a high priority to pregnancy prevention and AIDS prevention.* This may be the most important recommendation. The only clinics that seemed to have affected the use of pills and condoms gave pregnancy prevention or AIDS prevention a very high priority.

• *Conduct more outreach in the school.* The reasons students gave for not using contraceptives included lack of knowledge and skills, and many students became pregnant or caused a pregnancy before visiting the school clinic. Furthermore, two of the apparently effective clinics had developed strong educational and outreach programs in their schools to provide teens with information, skills and motivation that may have helped them make better sexual and contraceptive decisions.

• *Develop programs to delay and reduce sexual activity.* In each school, a large majority of the students were sexually experienced, and many had engaged in sex before entering high school. Therefore, programs to delay or reduce sexual activity should begin in elementary and junior high school. However, because many students had not yet had sex when they entered high school and many sexually experienced students had sex infrequently, such programs may also be useful in high school. At two sites, there was some evidence that counseling or other programs might have delayed initiation of intercourse.

• *Identify and target students engaged in sexual activity.* Many sexually experienced students did not use the clinic for contraceptives, and many others became pregnant before doing so. Although the clinics generally were effective in treating and counseling students who sought specific services, they must seek out students at risk who are not already motivated to visit the clinics if they are to have a significant impact on sexual risk-taking behavior. Clinic staff should ask students about sexual risk-taking behavior whenever appropriate during clinic visits.

• *Make contraceptives available through the clinics.* The clinics that prescribed or dispensed contraceptives served far more students than those that provided only counseling, and the three clinics that dispensed contraceptives served higher proportions of sexually experienced females than the one that provided vouchers for students to get contraceptives elsewhere.

• *Conduct effective follow-up procedures.* Many females who obtained oral contraceptives from clinics stopped getting them within six months. Although some of these students probably stopped having sex or got contraceptives from other sources, some simply engaged in unprotected sex. Effective follow-up procedures may improve contraceptive continuation rates.

• *Emphasize condoms and male responsibility.* The findings in San Francisco and Muskegon suggest that clinics, schools and communities working together can have an impact on use of condoms. At those sites there were greater differences in condom use than in pill use. Males are less likely than females to visit the clinic for family planning purposes, but they can be reached through sports physicals, classroom activities and other school and community activities. And, of course, females can be taught to exert greater pressure on males to use condoms.

These recommendations are not necessarily easy to implement. Some of them require additional funding and staffing, and it will remain difficult to change students' risk-taking behaviors, many of which are deeply rooted in the values and practices of the larger community. Nevertheless, by adopting some of these recommendations and by giving greater priority to reproductive health, school-based clinics may become more effective in reducing sexual risk-taking behavior.

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